

WHAT IS CLAIMED IS:

1. An isolated nucleic acid molecule comprising:
  - (a) the nucleotide sequence as set forth in any of SEQ ID NO: 1, SEQ ID NO: 3, or SEQ ID NO: 5;
  - (b) a nucleotide sequence encoding the polypeptide as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6;
  - (c) a nucleotide sequence that hybridizes under at least moderately stringent conditions to the complement of the nucleotide sequence of either (a) or (b); or
  - (d) a nucleotide sequence complementary to the nucleotide sequence of either (a) or (b).
2. An isolated nucleic acid molecule comprising:
  - (a) a nucleotide sequence encoding a polypeptide that is at least about 70 percent identical to the polypeptide as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6, wherein the encoded polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6;
  - (b) a nucleotide sequence encoding an allelic variant or splice variant of the nucleotide sequence as set forth in any of SEQ ID NO: 1, SEQ ID NO: 3, or SEQ ID NO: 5 or the nucleotide sequence of (a);
  - (c) a region of the nucleotide sequence of any of SEQ ID NO: 1, SEQ ID NO: 3, or SEQ ID NO: 5 or the nucleotide sequence of (a) or (b) encoding a polypeptide fragment of at least about 25 amino acid residues, wherein the polypeptide fragment has an activity of the encoded polypeptide as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6, or is antigenic;
  - (d) a region of the nucleotide sequence of any of SEQ ID NO: 1, SEQ ID NO: 3, or SEQ ID NO: 5 or the nucleotide sequence of any of (a) - (c) comprising a fragment of at least about 16 nucleotides;
  - (e) a nucleotide sequence that hybridizes under at least moderately stringent conditions to the complement of the nucleotide sequence of any of (a) - (d); or

(f) a nucleotide sequence complementary to the nucleotide sequence of any of (a) - (d).

3. An isolated nucleic acid molecule comprising:

5 (a) a nucleotide sequence encoding a polypeptide as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 with at least one conservative amino acid substitution, wherein the encoded polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6;

10 (b) a nucleotide sequence encoding a polypeptide as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 with at least one amino acid insertion, wherein the encoded polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6;

15 (c) a nucleotide sequence encoding a polypeptide as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 with at least one amino acid deletion, wherein the encoded polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6;

20 (d) a nucleotide sequence encoding a polypeptide as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 that has a C- and/or N- terminal truncation, wherein the encoded polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6;

25 (e) a nucleotide sequence encoding a polypeptide as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 with at least one modification that is an amino acid substitution, an amino acid insertion, an amino acid deletion, C-terminal truncation, or N-terminal truncation, wherein the encoded polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6;

(f) a nucleotide sequence of any of (a) - (e) comprising a fragment of at least about 16 nucleotides;

(g) a nucleotide sequence that hybridizes under at least moderately stringent conditions to the complement of the nucleotide sequence of any of (a) - (f); or

30 (h) a nucleotide sequence complementary to the nucleotide sequence of any of (a) - (e).

4. A vector comprising the nucleic acid molecule of any of Claims 1, 2, or 3.

5. A host cell comprising the vector of Claim 4.

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6. The host cell of Claim 5 that is a eukaryotic cell.

7. The host cell of Claim 5 that is a prokaryotic cell.

10 8. A process of producing a GPCR polypeptide comprising culturing the host cell of Claim 5 under suitable conditions to express the polypeptide, and optionally isolating the polypeptide from the culture.

9. A polypeptide produced by the process of Claim 8.

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10. The process of Claim 8, wherein the nucleic acid molecule comprises promoter DNA other than the promoter DNA for the native GPCR polypeptide operatively linked to the DNA encoding the GPCR polypeptide.

20 11. The isolated nucleic acid molecule according to Claim 2, wherein the percent identity is determined using a computer program selected from the group consisting of GAP, BLASTN, FASTA, BLASTA, BLASTX, BestFit, and the Smith-Waterman algorithm.

25 12. A process for determining whether a compound inhibits GPCR polypeptide activity or GPCR polypeptide production comprising exposing a cell according to any of Claims 5, 6, or 7 to the compound and measuring GPCR polypeptide activity or GPCR polypeptide production in said cell.

30 13. An isolated polypeptide comprising the amino acid sequence as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6.

14. An isolated polypeptide comprising:

(a) an amino acid sequence for an ortholog of any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6;

5 (b) an amino acid sequence that is at least about 70 percent identical to the amino acid sequence of any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6, wherein the polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6;

(c) a fragment of the amino acid sequence set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 comprising at least about 25 amino acid residues, wherein the fragment has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6, or is antigenic; or

(d) an amino acid sequence for an allelic variant or splice variant of the amino acid sequence as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 or  
15 the amino acid sequence of either (a) or (b).

15. An isolated polypeptide comprising:

(a) the amino acid sequence as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 with at least one conservative amino acid substitution, wherein  
20 the polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6;

(b) the amino acid sequence as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 with at least one amino acid insertion, wherein the polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or  
25 SEQ ID NO: 6;

(c) the amino acid sequence as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 with at least one amino acid deletion, wherein the polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or  
SEQ ID NO: 6;

30 (d) the amino acid sequence as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 that has a C- and/or N- terminal truncation, wherein the

polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6; or

- (e) the amino acid sequence as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6 with at least one modification that is an amino acid substitution, an amino acid insertion, an amino acid deletion, C-terminal truncation, or N-terminal truncation, wherein the polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6.

16. An isolated polypeptide encoded by the nucleic acid molecule of any of Claims 1, 2, or 3, wherein the polypeptide has an activity of the polypeptide set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6.

17. The isolated polypeptide according to Claim 14, wherein the percent identity is determined using a computer program selected from the group consisting of GAP, BLASTP, FASTA, BLASTA, BLASTX, BestFit, and the Smith-Waterman algorithm.

18. A selective binding agent or fragment thereof that specifically binds the polypeptide of any of Claims 13, 14, or 15.

19. The selective binding agent or fragment thereof of Claim 18 that specifically binds the polypeptide comprising the amino acid sequence as set forth in any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6, or a fragment thereof.

20. The selective binding agent of Claim 18 that is an antibody or fragment thereof.

21. The selective binding agent of Claim 18 that is a humanized antibody.

22. The selective binding agent of Claim 18 that is a human antibody or fragment thereof.

23. The selective binding agent of Claim 18 that is a polyclonal antibody or fragment thereof.

5 24. The selective binding agent Claim 18 that is a monoclonal antibody or fragment thereof.

25. The selective binding agent of Claim 18 that is a chimeric antibody or fragment thereof.

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26. The selective binding agent of Claim 18 that is a CDR-grafted antibody or fragment thereof.

27. The selective binding agent of Claim 18 that is an antiidiotypic antibody or fragment thereof.

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28. The selective binding agent of Claim 18 that is a variable region fragment.

29. The variable region fragment of Claim 28 that is a Fab or a Fab' fragment.

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30. A selective binding agent or fragment thereof comprising at least one complementarity determining region with specificity for a polypeptide having the amino acid sequence of any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6.

25 31. The selective binding agent of Claim 18 that is bound to a detectable label.

32. The selective binding agent of Claim 18 that antagonizes GPCR polypeptide biological activity.

33. A method for treating, preventing, or ameliorating a GPCR polypeptide-related disease, condition, or disorder comprising administering to a patient an effective amount of a selective binding agent according to Claim 18.

5 34. A selective binding agent produced by immunizing an animal with a polypeptide comprising an amino acid sequence of any of SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6.

35. A hybridoma that produces a selective binding agent capable of binding a  
10 polypeptide according to any of Claims 13, 14, or 15.

36. A method of detecting or quantitating the amount of GPCR polypeptide using the anti-GPCR antibody or fragment of Claim 18.

15 37. A kit for detecting or quantitating the amount of GPCR polypeptide in a biological sample, comprising the selective binding agent of Claim 18.

38. A composition comprising the polypeptide of any of Claims 13, 14, or 15, and a pharmaceutically acceptable formulation agent.

20 39. The composition of Claim 38, wherein the pharmaceutically acceptable formulation agent is a carrier, adjuvant, solubilizer, stabilizer, or anti-oxidant.

40. A polypeptide comprising a derivative of the polypeptide of any of Claims  
25 13, 14, or 15.

41. The polypeptide of Claim 40 that is covalently modified with a water-soluble polymer.

30 42. The polypeptide of Claim 41, wherein the water-soluble polymer is polyethylene glycol, monomethoxy-polyethylene glycol, dextran, cellulose, poly-(N-

vinyl pyrrolidone) polyethylene glycol, propylene glycol homopolymers, polypropylene oxide/ethylene oxide co-polymers, polyoxyethylated polyols, or polyvinyl alcohol.

43. A composition comprising a nucleic acid molecule of any of Claims 1, 2,  
5 or 3 and a pharmaceutically acceptable formulation agent.

44. The composition of Claim 43, wherein said nucleic acid molecule is  
contained in a viral vector.

10 45. A viral vector comprising a nucleic acid molecule of any of Claims 1, 2,  
or 3.

46. A fusion polypeptide comprising the polypeptide of any of Claims 13, 14,  
or 15 fused to a heterologous amino acid sequence.

15 47. The fusion polypeptide of Claim 46, wherein the heterologous amino acid  
sequence is an IgG constant domain or fragment thereof.

48. A method for treating, preventing, or ameliorating a medical condition  
20 comprising administering to a patient the polypeptide of any of Claims 13, 14, or 15, or  
the polypeptide encoded by the nucleic acid of any of Claims 1, 2, or 3.

49. A method of diagnosing a pathological condition or a susceptibility to a  
pathological condition in a subject comprising:

25 (a) determining the presence or amount of expression of the polypeptide of  
any of Claims 13, 14, or 15, or the polypeptide encoded by the nucleic acid molecule of  
any of Claims 1, 2, or 3 in a sample; and

(b) diagnosing a pathological condition or a susceptibility to a pathological  
condition based on the presence or amount of expression of the polypeptide.

30 50. A device, comprising:



- (a) a membrane suitable for implantation; and
- (b) cells encapsulated within said membrane, wherein said cells secrete a protein of any of Claims 13, 14, or 15; and

said membrane is permeable to said protein and impermeable to materials  
5 detrimental to said cells.

51. A method of identifying a compound that binds to a GPCR polypeptide comprising:

- (a) contacting the polypeptide of any of Claims 13, 14, or 15 with a  
10 compound; and
- (b) determining the extent of binding of the GPCR polypeptide to the compound.

52. The method of Claim 51, further comprising determining the activity of  
15 the polypeptide when bound to the compound.

53. A method of modulating levels of a polypeptide in an animal comprising administering to the animal the nucleic acid molecule of any of Claims 1, 2, or 3.

54. A transgenic non-human mammal comprising the nucleic acid molecule of  
20 any of Claims 1, 2, or 3.

55. A process for determining whether a compound inhibits GPCR polypeptide activity or GPCR polypeptide production comprising exposing a transgenic  
25 mammal according to Claim 54 to the compound, and measuring GPCR polypeptide activity or GPCR polypeptide production in said mammal.

56. A nucleic acid molecule of any of Claims 1, 2, or 3 attached to a solid support.

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57. An array of nucleic acid molecules comprising at least one nucleic acid molecule of any of Claims 1, 2, or 3.

58. An isolated polypeptide comprising the amino acid sequence as set forth  
5 in SEQ ID NO: 2 with at least one conservative amino acid substitution that is a aspartic  
acid at position 2; leucine at position 8; glutamic acid at position 12; proline at position  
13; threonine at position 15; leucine at position 24; valine at position 25; leucine at  
position 27; isoleucine or leucine at position 35; serine at position 49; isoleucine at  
position 52; isoleucine at position 82; leucine at position 83; alanine at position 87;  
10 leucine at position 90; valine at position 91; lysine or methionine at position 94; valine at  
position 111; methionine at position 123; alanine at position 126; N at position 129;  
threonine at position 131; alanine at position 134; threonine at position 135; alanine at  
position 136; valine at position 138; threonine at position 141; methionine at position  
152; serine at position 154; arginine at position 159; glycine at position 160; methionine  
15 at position 161; leucine or valine at position 162; serine at position 163; valine at position  
179; leucine at position 187; threonine at position 190; valine at position 197; asparagine  
at position 198; valine at position 199; glutamine at position 205; threonine at position  
210; arginine at position 216; arginine at position 217; serine at position 227; leucine at  
position 238; threonine at position 249; threonine or isoleucine at position 258; valine at  
20 position 262; leucine at position 266; leucine at position 269; leucine at position 285;  
alanine at position 290; threonine at position 293; arginine at position 295; arginine at  
position 300; arginine at position 301; arginine at position 304; threonine at position 305;  
glutamine at position 306; alanine at position 307; arginine at position 308; serine at  
position 310; glycine at position 319; serine at position 320; lysine at position 321; serine  
25 at position 322; threonine at position 324; aspartic acid at position 325; glycine at  
position 326; valine at position 327; arginine at position 329; serine at position 330;  
arginine at position 332; proline at position 334; glycine at position 339; leucine at  
position 340; glutamine at position 341; and valine at position 342; wherein the  
polypeptide has an activity of the polypeptide set forth in SEQ ID NO: 2.

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